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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,787	03/29/2004	Michael E. Miller	87217AJA	4216

7590 03/22/2007

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EXAMINER	
WILLIS, RANDAL L	
ART UNIT	PAPER NUMBER
2629	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/812,787	MILLER ET AL.	
	Examiner	Art Unit	
	Randal L. Willis	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30 and 32-38* is/are rejected.

7)☒ Claim(s) *31 and 39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :4/14/2005, 12/30/2005 and 6/13/2006.

DETAILED ACTION

1. This office action is in response to application No. 10/812787 filed March 29, 2004. Claims 1-39 are pending and have been examined.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 4/14/2005, 12/30/2005 and 6/13/2006 have been considered by the examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3,7, 9-12, 20-26 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by WO00/11728 as referenced by Burroughes (US 6,693,611).

Apropos claim 1, Burroughes teaches:

A color OLED display device, comprising:

a) an array of light emitting pixels (Col 1 line 60-61), each pixel having red, green, and blue OLEDs (Col 1 line 62)and at least one additional colored OLED (Col 1 line 63-64)that expands the gamut of the display device relative to the gamut defined by the red, green and blue OLEDs, wherein the luminance efficiency or the luminance stability over time of the additional OLED is higher than the luminance efficiency or the luminance stability over time of at least one of the red, green, and blue OLEDs (Col 1 line 64-65, being more sensitive to the human eye means it will have a higher luminance efficiency); and

b) means for selectively driving the OLEDs with a drive signal to reduce overall power usage or extend the lifetime of the display while maintaining display color accuracy (Col 2 lines 34-38).

Apropos claim 2, Burroughes teaches:

The display device claimed in claim 1 wherein the means for driving the OLEDs results in a drive signal to produce a given color and luminance at a reduced power usage (control signal for emitters Col 2 lines 45-50).

Apropos claim 3, Burroughes teaches:

The display device claimed in claim 2, wherein the means for driving considers the luminance efficiency of each OLED to deliver the reduced power usage (Col 2 lines 34-38).

Apropos claim 7, Burroughes teaches:

The display device claimed in claim 1, wherein the drive signal is dependent upon a control signal (Col 2 lines 26-28).

Aporopos claim 9, Burroughes teaches:

The display device claimed in claim 1, wherein the means for driving produces a constant ratio of luminance values between two different color OLEDs while the integrated color produced by the combination of all the OLEDs has a constant chromaticity coordinate ().

Apropos claim 10, Burroughes teaches:

The display device claimed in claim 1, wherein the means for driving produces a variable ratio of luminance values between two different color OLEDs while the integrated color produced by the combination of all the OLEDs has a constant chromaticity coordinate ().

Apropos claim 11, Burroughes teaches:

The display device claimed in claim 1, wherein the means for driving the OLEDs provides a means for converting a three-color input signal to a four or more number of colors signal equal to the number of different color light emitting OLEDs in each pixel (Col 5 lines 32-36).

Apropos claim 12, Burroughes teaches:

The OLED display device claimed in claim 1, wherein one or more of the additional OLEDs is cyan in color (Col 2 lines 23-24).

Apropos claim 14, Burroughes teaches:

The OLED display device claimed in claim 1, wherein one or more of the OLEDs are formed by patterning different emissive materials that emit light of different colors to form the OLED (Col 4 lines 56-59).

Apropos claim 20, Burroughes teaches:

The OLED display device in claim 1, wherein the OLED display device is a top-emitting OLED device (Burroughes teaches an OLED display, it's a matter of design choice the style of OLED device used such as top-emitting, since the teaching of Burroughes can be used with any).

Apropos claim 21, Burroughes teaches:

The OLED display device in claim 1, wherein the OLED display device is a bottom-emitting OLED device (Burroughes teaches an OLED display, it's a matter of design choice the style of OLED device used such as bottom-emitting, since the teaching of Burroughes can be used with any).

Apropos claim 22, Burroughes teaches:

The OLED display device in claim 1, wherein the OLED display device is an active-matrix device (Col 6 lines 19-21).

Apropos claim 23, Burroughes teaches:

The OLED display device in claim 1, wherein the OLED display device is a passive-matrix device (Col 5 lines 14-15).

Apropos claim 24, Burroughes teaches:

The OLED display device claimed in claim 1, wherein the means for driving reduces power usage to a minimum by selecting the combination of three OLEDs in each pixel that results in the lowest power consumption for producing a desired color in each pixel (Col 5 lines 48-58).

Apropos claim 25, Burroughes teaches:

The OLED display device claimed in claim 1, wherein the means for driving produces colors near white using a combination of light from the additional OLED(s) and light from one or fewer of the two OLEDs with the lowest luminance efficiency (Col 5-6 lines 65-2).

Apropos claim 26, Burroughes teaches:
The OLED display device claimed in claim 25, wherein the two OLEDs with the lowest luminance efficiency are the red and blue OLEDs (Col 1 lines 7-11).

Apropos claim 32, Burroughes teaches:
The OLED display device claimed in claim 1, wherein the means for driving performs a conversion from an RGB signal to a device drive signal by calculation in real time (Col 5 lines 36-43).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United

States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-14 and 27-30, 32,33 are rejected under 35 U.S.C. 102(e) as being anticipated by anticipated by Cok (US 6,570,584).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Apropos claim 1, Cok teaches teaches:

A color OLED display device, comprising:

a) an array of light emitting pixels (Col 3 lines 29-32), each pixel having red, green, and blue OLEDs (Col 3 lines 34-35)and at least one additional colored OLED (Col 3 lines 32-37)that expands the gamut of the display device relative to the gamut defined by the red, green and blue OLEDs, wherein the luminance efficiency or the luminance stability over time of the additional OLED is higher than the luminance efficiency or the

luminance stability over time of at least one of the red, green, and blue OLEDs (Col 3 lines 50-53); and

b) means for selectively driving the OLEDs (Col 3 lines 63-65 and Col 4 lines 18-22) with a drive signal to reduce overall power usage or extend the lifetime of the display while maintaining display color accuracy (Col 3 lines 52-53).

Apropos claim 2, Cok teaches:

The display device claimed in claim 1 wherein the means for driving the OLEDs results in a drive signal to produce a given color and luminance at a reduced power usage (Col 3 lines 46-48).

Apropos claim 3, Cok teaches:

The display device claimed in claim 2, wherein the means for driving considers the luminance efficiency of each OLED to deliver the reduced power usage (Col 3 line 45-50).

Apropos claim 4, Cok teaches:

The display device claimed in claim 1, wherein the means for driving the OLEDs results in a drive signal to produce a given color and luminance at an improved lifetime (Col 3 line 45-50).

Apropos claim 5, Cok teaches:

The display device claimed in claim 4, wherein the means for driving considers the luminance efficiency of each OLED to deliver the improved lifetime (Col 3 line 45-55).

Apropos claim 6, Cok teaches:

The display device claimed in claim 4, wherein the means for driving considers the luminance stability over time of the material used to form each OLED to deliver improved lifetime (Col 3 lines 45-55).

Apropos claim 7, Cok teaches:

The display device claimed in claim 1, wherein the drive signal is dependent upon a control signal (Pixel value signal input into control 32, Fig 1).

Apropos claim 8, Cok teaches:

The display device claimed in claim 7, wherein the control signal varies as a function one or more of a set including a resistance, voltage, current, temperature, ambient illumination, display luminance, and/or scene content (Display luminance is part of pixel value data in conventional color specification signals, display uses conventional signals Col 2 lines 52-55).

Aporopos claim 9, Cok teaches:

The display device claimed in claim 1, wherein the means for driving produces a constant ratio of luminance values (Col 4 lines 1-3) between two different color OLEDs while the integrated color produced by the combination of all the OLEDs has a constant chromaticity coordinate .

Apropos claim 10, Cok teaches:

The display device claimed in claim 1, wherein the means for driving produces a variable ratio of luminance values between two different color OLEDs while the integrated color produced by the combination of all the OLEDs has a constant chromaticity coordinate (Col 3 lines 53-55).

Apropos claim 11, Cok teaches:

The display device claimed in claim 1, wherein the means for driving the OLEDs provides a means for converting a three-color input signal to a four or more number of colors signal equal to the number of different color light emitting OLEDs in each pixel (30, Fig 1 and Col 4 lines 1-3).

Apropos claim 12, Cok teaches:

The OLED display device claimed in claim 1, wherein one or more of the additional OLEDs is cyan in color (Col 4 line 64).

Apropos claim 13, Cok teaches:

The OLED display device claimed in claim 1, wherein one or more of the additional OLEDs is yellow in color (Col 4 line 65).

Apropos claim 14, Cok teaches:

The OLED display device claimed in claim 1, wherein one or more of the OLEDs are formed by patterning different emissive materials that emit light of different colors to form the OLED (Col 5 line 20-25).

Apropos claim 27, Cok teaches:

The OLED display device claimed in claim 1, having two or more additional OLEDs that expand the gamut (Col 3 line 32-33)relative to the gamut defined by the red, green and blue OLEDs, wherein one or more of the additional OLEDs emits cyan light (Col 4 line 64) and one or more of the additional OLEDs emits yellow light (Col 4 line 65).

Apropos claim 28, Cok teaches:

The OLED display device claimed in claim 27, wherein red and yellow OLEDs are positioned next to one another (See Fig. 6 Y and R represent Yellow and Red and are adjacent to one another).

Apropos claim 29, Cok teaches:

The OLED display device claimed in claim 27, wherein blue and cyan OLEDs are positioned next to one another (See Fig. 6 Blue B and Cyan C are adjacent to each other).

Apropos claim 30, Cok teaches:

The OLED display device claimed in claim 27, wherein a green OLED is positioned between yellow and cyan OLEDs (See Fig. 5 Green G is between Cyan C and Yellow Y in first row).

Apropos claim 32, Cok teaches:

The OLED display device claimed in claim 1, wherein the means for driving performs a conversion from an RGB signal to a device drive signal by calculation in real time (Col 4 line 6).

Apropos claim 33, Cok teaches:

The OLED display device claimed in claim 1, wherein the means for driving performs a conversion from an RGB signal to a device drive signal by referencing to a look-up table (Col 4 line 6).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burroughes (6,693,611) in view of Koyama (US2002/0135312).

Apropos claim 15, Burroughes teaches an OLED display, however fails to explicitly teach:

wherein one or more of the OLEDs are formed by patterning a white-light emissive material.

In the same field of endeavor, Koyama teaches an OLED display that uses white light-emitting OLEDs ([0250] lines 1-3) and has improved resistance to brightness deterioration ([0014] lines 1-3).

Therefore it would have been obvious to one of ordinary skill in the art to use the OLED techniques taught by Koyama as the display device of Burroughes in order to provide a display with improved brightness.

Apropos claim 16, Koyama further teaches:

The OLED display device claimed in claim 15, wherein the color of one or more of the OLEDs is produced using a color filter ([0250] lines 1-3).

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burroughes (6,693,611) and Koyama (US2002/0135312) as applied to claim 15 above, and further in view of Antoniadis (6,366,017).

Apropos claim 17, the combine device of Burroughes and Koyama fail to explicitly teach

the color of one or more of the OLEDs is produced using a microcavity structure.

In the same field of OLED devices, Antoniadis teaches using a microcavity structure to further enhance emitted light of various colors (Col 4, lines 40-47).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a layer to introduce microcavity effects as taught by Antoniadis in the device of Burroughes and Koyama to enahce the emitted light in the given wavelengths required for a display device.

12. Claims 18, 34, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cok (US 6,570,584) in view of Elliott (US 6950115).

Apropos claim 18, Cok fails to explicitly teach the OLEDs are of different sizes.

In the same field of endeavour, Elliott teaches a OLED device with a unique pixel configuration conisistiong of OLEDs of different sizes (See sub-pixels 22, 24 and 26 in Fig. 3)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to employ a pixel configuration similar to that taught by Elliott in the display device of Cok in order to increase the resolution of the display (Col 4 lines 10-15).

Apropos claim 34, Cok fails to explicitly teach wherein each pixel comprises two or more OLEDs for emitting a same Color of light.

In the same field of endeavour, Elliott teaches a pixel configuration that employs multiple light emitters that emit the same color of light (See Fig. 5 and Col 3 lines 52-55).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the pixel structure of Cok's device to include multiple emitters of the same color as taught by Elliot in order to improve the resolution of the display (Col 4 lines 10-15).

Apropos claim 35, the combine device of Cok and Elliot teaches:
The OLED display device claimed in claim 34, wherein the two or more OLEDs that emit light of the same color (Elliot teaches having multiple emitters of the same color, the multiple emitters for green and red, Col 3 line 34, being those that have the perception by human vision, Col 4 line 11-13)in each pixel are additional colored OLED(s) that expand the gamut of

the display device relative to the gamut defined by the red, green and blue OLEDs (Cok teaches that the additional pixels would have a higher sensitivity to human perception, Col 3 lines 50-53, and thus would be obvious choices for additional emitters as taught by Elliot).

Apropos claim 35, Elliot further teaches:
The OLED display device claimed in claim 34, wherein the two or more OLEDs that emit light of the same color in each pixel are one or more of the red, green or blue OLED(s) (Col 3 lines 52-55).

Apropos claim 37, Elliot further teaches:
The OLED display device claimed in claim 34, wherein there are more green light emitting OLEDs in each pixel than blue light emitting OLEDs (Col 3 lines 52-54).

Aproos claim 38, Elliot further teaches:
The OLED display device claimed in claim 34, wherein there are more red light emitting OLEDs in each pixel than blue light emitting OLEDs (Col 3 lines 52-54).

13. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burroughes (6693611) in view of Yamada (6366025).

Apropos claim 19, Burroughes teaches additional OLEDs with higher efficiency than at least one of the red, green or blue OLEDs (Abstract lines 3-5).

However Burroughes fails to explicitly teach having the additional OLED be larger than at least one of the red, green or blue OLEDs.

In the same field of endeavor, Yamada teaches having subpixel areas of different sizes to protect subpixels from prematurely deteriorating (col. 3 and col. 4)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to protect the OLEDs that would be most used by increasing the area as taught by Yamada, which in Burroughes's device would be the display elements with the higher efficiencies, such as light-emissive zones 2 and 4 (Col 5 line 50-52) in order to prevent premature deterioration of the light-emitting elements.

Allowable Subject Matter

14. Claims 31 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Kuriwaki 6,097,367 for teaching a 3 to N conversion and more than three sub-pixels

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randal L. Willis whose telephone number is (571) 270-1461. The examiner can normally be reached on Monday to Friday from 7:30am to 5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RLW

AMR A. AWAD
SUPERVISORY PATENT EXAMINER